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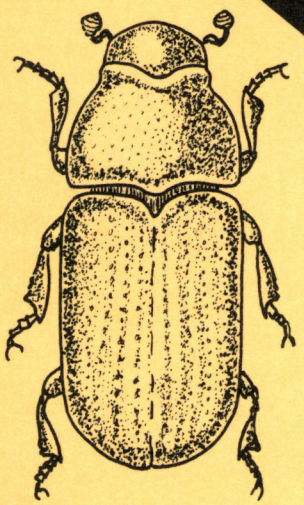

Southwestern Region

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BIOLOGICAL EVALUATION
Southwestern Tent Caterpillar

Sabino Canyon
Santa Catalina Ranger
District
Coronado National
Forest
Arizona

1972

Branch of Forest Insect and Disease Management
Division of Timber Management
Southwestern Region, USDA, Forest Service
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INTRODUCTION

A biological evaluation of the southwestern tent caterpillar, Malacosoma incurvum incurvum (Henry Edwards), population in Sabino Canyon, Santa Catalina District, Coronado National Forest, was made in March and May 1972.

On March 30, 1972, Paul Buffam and Bob Frye collected cocoons to determine adult moth and parasite emergence. Moths emerged from only 8.0% of the collected cocoons. Parasites and hyperparasites were numerous.

On May 3, 1972, Chuck Germain and Bob Frye conducted an egg mass survey in the canyon. Only one egg mass was collected from the 40 host trees sampled.

The southwestern tent caterpillar population is endemic in Sabino Canyon.

GENERAL INFORMATION

Location.--Sabino Canyon Recreation Area, Santa Catalina District, Coronado National Forest. This high-use recreation area is on the northeast outskirts of the city of Tucson.

Insect.--A southwestern tent caterpillar, Malacosoma incurvum incurvum (Henry Edwards)

Host.--Fremont cottonwood, Populus fremontii S. Wats., and Goodding willow, Salix gooddingi Ball

Type of Damage.--Individual trees were lightly to moderately defoliated in March and April 1972. Defoliation occurred throughout the host type. The host trees were refoliated by mid-May 1972.

BIOLOGICAL INFORMATION

Moth and Parasite Evaluation

Methods.--A total of 1,053 cocoons were collected from tents on willow and cottonwood between the dam and last bridge. Parasite pupae found lying loose in the tents were not collected. The cocoons which had been separated by sample location and host species were flown to Albuquerque and placed in groups of tens in petri dishes. Emergence was followed daily from March 31 until May 9, when emergence ceased. The remaining intact cocoons were dissected to determine the cause of lack of emergence.

Results.--Only 8.0% of the moths--55 males and 29 females--emerged from the 1,053 cocoons between March 31 and May 9 (Table 1). Parasite emergence was from April 6-28, and peaked on the 19th. A total of 524 parasites and hyperparasites--85 Diptera and 439 Hymenoptera--emerged from collected cocoons. Most of the Hymenoptera were Brachymeria ovata (Say), which is a hyperparasite of the dipterous parasite, Archytas lateralis (Macquart). Therefore, the number of cocoons parasitized by dipterous parasites was larger than that shown in Table 1. Cocoons containing a hyperparasite were counted as parasitized. The remaining 422 cocoons, from which neither moths nor parasites emerged, contained either dead larvae or pupae, or their remains. Many of these specimens may have been parasitized by the parasites which pupated in the tents instead of inside of the cocoons. This would account for the cocoons which appeared parasitized, but from which no parasites emerged.

Egg Mass Evaluation

Methods.--Forty host trees--16 willow and 24 cottonwood--were permanently tagged in Sabino Canyon in January 1971 (Buffam, 1971). The 1972-73 generation egg mass survey was made on May 1972. Two 30-inch branch samples were cut from the upper or midcrown region of each sample tree and examined for new egg masses.

Results.--Only one new egg mass was found on the 80 cut branches (Table 2). This is an average of 0.02 egg masses per two 30-inch branches.

DISCUSSION

Parasitism during the 1970-71 and 1971-72 generations, combined with the lack of suitable host material during the 1970-71 generation, has reduced the tent caterpillars to an endemic level. Parasitism increased from 36.7% in 1971 to at least 51.9% in 1972. Parasitism would have probably been higher if parasite pupae found in the tents would have been counted.

Caterpillar populations were so high in 1971 that some trees were completely defoliated before the larvae had completed development. The caterpillars then dropped from the trees to seek suitable host material which helped to reduce the population.

The egg mass survey indicated there would be very little defoliation in 1973. Biological factors have reduced the average number of egg masses per two 30-inch branches to 0.02 for the 1972-73 generation, compared to 1.3 for the 1971-72 generation, and 4.5 for the 1970-71 generation.

Table 1.--Summary of parasite and moth emergence from tent caterpillar cocoons collected at Sabino Canyon, Arizona, on April 8, 1971, and March 30, 1972.

	1971		1972	
	No.	%	No.	%
Normal adult emergence	356	44.4	84	8.0
Cocoons parasitized by Diptera	78	9.7	89	8.4
Cocoons parasitized by Hymenoptera	217	27.0	458	43.5
Total parasitized cocoons	295	36.7	547	51.9

Table 2.--Results of tent caterpillar egg mass evaluation in January-February 1971 (1970-71 generation), May 1971 (1971-72 generation), and May 1972 (1972-73 generation) at Sabino Canyon.

Tree No.	Tree species[a/]	No. of egg masses/two 30-in. branches		
		1970-71	1971-72	1972-73
350	W	7	1	0
351	C	6	4	0
352	C	3	4	0
353	C	8	9	0
354	W	4	0	0
355	W	4	0	0
356	C	7	2	0
357	C	7	0	0
358	C	5	1	0
359	C	9	1	1
360	C	7	1	0
361	C	6	3	0
362	W	3	1	0
363	C	7	1	0
364	W	2	0	0
365	W	5	0	0
367	C	5	1	0
368	W	3	0	0
369	C	3	2	0
370	C	3	1	0
371	W	2	1	0
372	W	6	2	0
373	W	7	1	0
374	W	4	0	0
375	C	7	2	0
376	C	9	3	0
377	C	2	3	0
378	W	4	2	0
379	C	4	0	0
380	C	6	0	0
381	C	5	2	0
382	W	3	0	0
383	W	1	0	0
384	W	4	0	0
385	C	1	4	0
386	C	5	1	0

Table 2.--Results of tent caterpillar egg mass evaluation in January-February 1971 (1970-71 generation), May 1971 (1971-72 generation), and May 1972 (1972-73 generation) at Sabino Canyon (continued).

Tree No.	Tree species[a/]	No. of egg masses/two 30-in. branches 1970-71	1971-72	1972-73
387	C	1	0	0
388	C	2	0	0
389	C	1	0	0
390	W	1	0	0
Total		179	53	1
Mean		4.5	1.3	0.02
Willow				
Total		60	8	0
Mean		3.8	0.5	0
Cottonwood				
Total		119		1
Mean		5.0		

a/ W = willow; C = cottonwood.

During the course of this infestation, defoliation has not caused tree mortality, although scattered branch killing was found. Refoliation occurred on most trees, even after complete defoliation, within 2 months.

LITERATURE CITED

Buffam, P. E. 1971. Biological evaluation: southwestern tent caterpillar infestation, Sabino Canyon, Santa Catalina District, Coronado National Forest, Arizona. USDA Forest Serv., Reg. 3, Div. of Timber Manage. 7 p.